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CONTROL OF WIREWORMS IN NOVA SCOTIA

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Wireworms are not so injurious in Nova Scotia as in some of the other provinces of Canada, but numerous requests for information about their control indicate that they are frequently troublesome. Many requests come from people who have grown susceptible crops on land turned from sod the same spring or a year before. Sod land that has not been cultivated for several years may harbor these pests in destructive numbers. Wireworm infestations, once established, are remarkably persistent and if not controlled will prevent the successful production of certain crops, especially potatoes.

According to reports and surveys in Nova Scotia, wireworms are most abundant in Hants County and the Annapolis Valley, and in districts near Digby, Weymouth, Meteghan, Yarmouth, Lunenburg, Bedford, St. Margaret's Bay, Dartmouth, Sydney and North Sydney. Conditions in New Brunswick, Prince Edward Island and Newfoundland are not well known, but it is thought that they are similar to those in Nova Scotia and the recommendations given here may be tried.

DESCRIPTION

Wireworms are the rather hard, cylindrical larvae of click beetles. They are usually bright yellowish-brown and the commonest and most injurious species¹ in Nova Scotia have two dark pits, or "eye-spots," on the upper side of the last segment. When full-grown they are almost an inch long and nearly as thick as the lead in a pencil. They do not curl when disturbed.

The adults, or "click" beetles, are so named because of their habit of snapping themselves into the air when placed on their backs. The most common of these beetles in Nova Scotia are dull reddish-brown or black and are about three eighths of an inch long, although they vary in length according to the species.

LIFE HISTORY

Wireworm eggs are usually laid in sod in late spring. They hatch in a short time and the young wireworms feed on the roots of various plants

¹ *Agriotes mancus* (Say), the wheat wireworm, a native species; *A. obscurus* (L.), *A. lineatus* (L.), and *A. sputator* (L.), all of European origin.

until winter. During the following summer they resume feeding; they become nearly full-grown by fall; and they change to pupae in late July or in August of the third summer. After two or three weeks the adults develop in the pupae, but they remain inactive until the following spring. Then they emerge to lay eggs for another generation. During the pupal stage, usually between July 20 and August 15, the insects are in small earthen cells. At this time they are very fragile and are easily injured by soil cultivation.

DAMAGE

Wireworms live beneath the surface of the soil and feed on the seeds, roots and stems of many plants. These include grasses, grains, weeds, and many garden and field crops, such as corn, beans, peas, carrots, turnips, potatoes and strawberries.



Wireworms hollow out the seeds and stems of cereals, causing the seedlings to wither and die. If seedlings wither in a field of grain, you can suspect a heavy wireworm infestation. To make sure, probe around the seeds to find the wireworms, for certain soil conditions can also make seedlings wither.

Damage to potatoes (see illustration at left) and root crops is usually not apparent until harvest, when open feeding tunnels or pits make them unsightly and unmarketable.

CONTROL

Cultural Control

In considering control, remember that it takes at least three years for wireworms to develop to the adult stage. The generations overlap so that all age groups and nearly all sizes are present in the soil at one time. These facts suggest that certain cultural practices and crop rotations should be followed in managing infested soils. In other words, on infested soils, grow crops that are not susceptible to damage from wireworms.

To prepare land for crops, the following program is useful. Cut hay early, preferably before the end of July. Then plow, turning the sod down flat to promote rapid decomposition. Harrow at once to destroy wireworms in pupal cells, and harrow several times before late fall to keep down weeds. The following spring, sow oats or barley, using a little more than the usual number of pounds per acre. The land should also be seeded to clover.

The following year, after harvesting the clover hay, plow the land early, and keep down weeds by harrowing a few times until the fall freeze-up. Next year, again seed to grain and clover. After harvesting this crop of clover hay, any crop may usually be grown safely. Crops such as peas and buckwheat are, like clover, little damaged by wireworms, and may be grown in rotation.

Wireworms are particularly numerous and persistent in poorly drained soils. Draining wet soils permits earlier working and seeding of the land in the spring. In general, any steps that promote rapid plant growth in the spring will reduce the severity of damage by wireworms. Drain wet soils; prepare the seed bed well; seed early and not too deeply; use recommended fertilizer mixtures; and use lime where needed.

Wireworms decrease in numbers in fields under annual cultivation but where they are very numerous to begin with the decrease may be disappointingly slow.

Chemical Control

Many kinds of insecticides leave undesirable residues in soils and crops, especially if they are applied too frequently or in excessive quantities. These residues sometimes impart an off-flavor to foods and forage, adversely affect plant growth, or harm beneficial organisms in the soil.

To combat undesirable side effects, research workers are continually subjecting insecticides to tests that can lead to rapid changes in recommendations for their use. Therefore, in this publication, recommendations for

Wireworm, pupa and adult



using specific insecticides at definite rates are not given. To obtain up-to-date recommendations, refer to provincial crop protection calendars or guides. These are published annually after consultation between federal and provincial agricultural officials.

Treating the soil with an insecticide reduces the size of wireworm populations more quickly than cultural control methods. The cost varies from four to ten dollars per acre, depending on the rate of application and the material used. The usual method is to plow the field, then apply the insecticide as a coarse spray and at once cultivate the top four inches of soil with a disk or spring-tooth harrow. Since one treatment may be effective for three years or more, depending on subsequent crops and the amount of cultivation, the cost per acre per year may be very small. Treatment reduces damage considerably, for over 90 percent of the wireworms are usually killed by the insecticide.

Treatment of Grassland -- Grassland may be treated with certain insecticides to control wireworms without cultivation. This procedure has substantially increased the yield and quality of hay.

Applications may be made in the spring or fall. The fall is usually preferred as livestock should not be allowed to pasture on grassland the year it is treated.

This method depends largely on the rain to wash the insecticide into the soil. Application between June 1 and September 1 is therefore not advisable as rainfall may be inadequate.

WARNING: Do not pasture livestock on grassland during the year of treatment.

A few new organo-phosphate insecticides are effective against wireworms but are not yet registered for this use in Canada. These insecticides have the great advantage that their residual toxicity is relatively very short, seldom exceeding a few months. Use them according to official or label recommendations.

Seed Treatment -- Do not treat potato seed pieces with insecticides as the crop is not satisfactorily protected by this method.

In the Prairie Provinces and in Ontario, treating seed wheat, oats, barley, rye, and corn with BHC, aldrin, or heptachlor has controlled wireworms. This method has not been widely used in Nova Scotia. However, results of latest research should be taken into consideration and the recommendations in the current provincial crop protection guide should be followed.

Soil Fumigants -- Soil fumigants such as ethylene dibromide and dichloropropene control wireworms quickly. However, they have not been tested to any extent in Nova Scotia, as their cost is high and application procedures are frequently impractical for field use. They are used chiefly

for crops of very high value per acre. See your latest provincial crop protection publication.

WARNING: Always observe strictly the precautions on the labels of insecticide packages.

Natural Control

Wireworms are attacked by various other insects, mites, nematodes, diseases and birds, but none of these agents has been known to reduce an infestation adequately in Nova Scotia.

For further information, write to the Research Station, Canada Department of Agriculture, Kentville, N.S.; or to the Nova Scotia Agricultural college, Horticulture and Biology Services Branch, Nova Scotia Department of Agriculture and Marketing, Truro, N.S.



